University of Washington Green Labs Proposal

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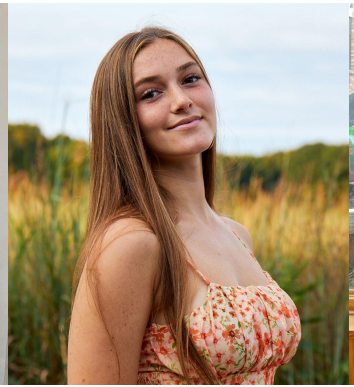
Team Introduction

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Report/ Presentation Design Lead	Communications and Project Lead	Meeting Minutes Documenter	Research and Data Analysis Lead	Project Manager

Agenda

1. Project Scope
2. Background Information and Project Introduction
3. Recommendations
4. Interim Q&A
5. Implementation Roadmap
6. Concluding Remarks
7. Group Q&A

Executive Summary

➔ **Original UW Green Labs Program**

- Full certification program
- Paused since 2020

➔ **Why should UW reinstate the Green Labs program?**

- Leadership Opportunities
- Estimated Cost Savings
- Creating a Safer Campus
- UW's Sustainability Commitments
- Promoting Social Equity and Justice

Executive Summary

➔ **Key Focus Areas and Recommended Initiatives**

- Energy and Water
- Waste Reduction
- Reuse and Recycling
- Green Chemistry and Safety
- Procurement and Consumables
- Social Justice and Equity Initiatives

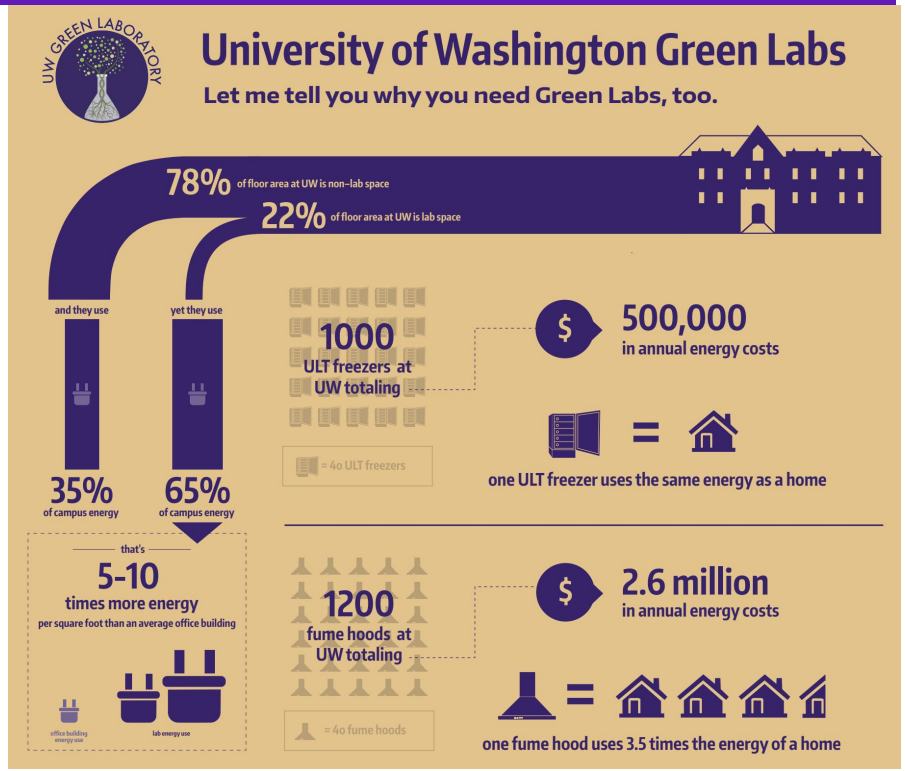
➔ **Staffing and Implementation**

- Community outreach and stakeholder engagement
- 1 FTE Position

Project Design

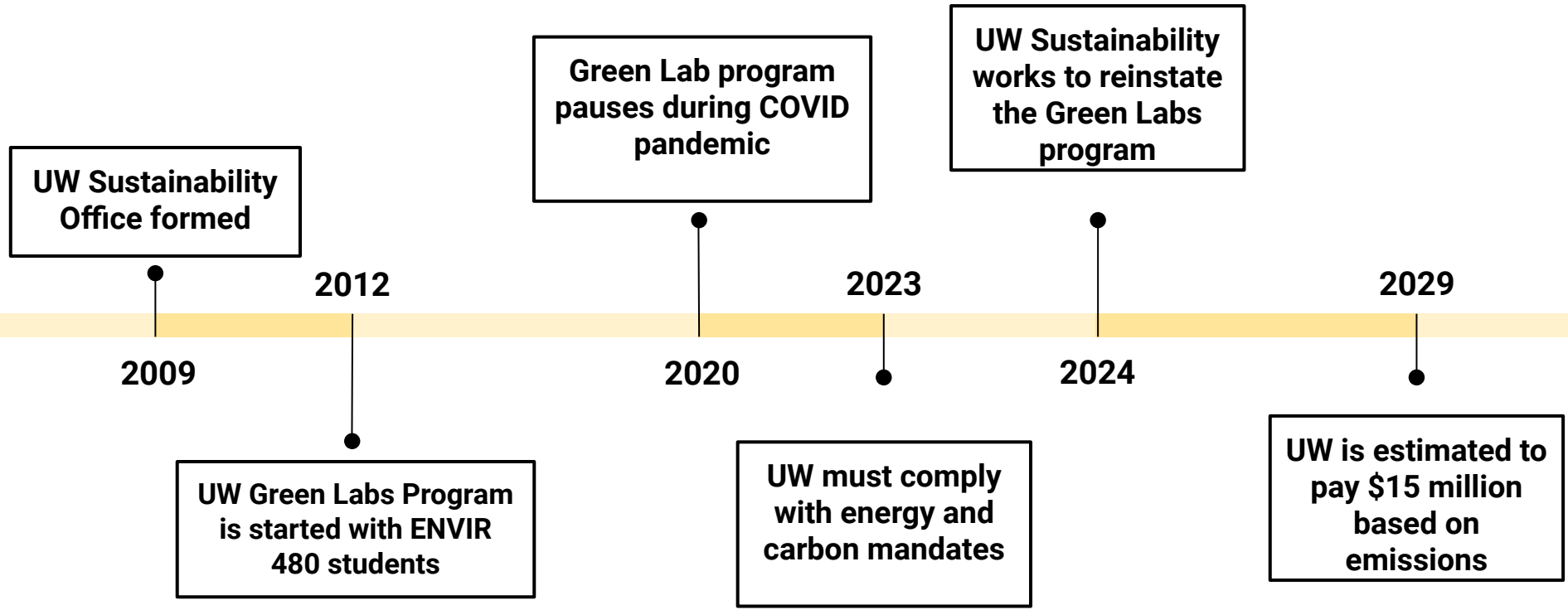
Introduction + Background

- **Original Green Labs Program created in 2012 (with ENVIR 480 students!)**
  - Approximately 775 labs across three UW campuses
  - 22% floor area of UW lab space, and use 65% of campus energy
  - 5-10 times more energy use than office spaces
- **Certification program with three levels**
  - Incentivized certification and provided resources to labs on campus



UW 2015 lab data

Introduction + Background



Peer and Aspirational Green Labs Programs

Top National Institutions:

➔ **University of Virginia**

- 5 focus areas: cold storage, chemicals and reagents, materials and refuse, electronics and appliances, and engagement.
- Highly engaged certification program and community outreach

➔ **University of Georgia**

- 4 focus areas: energy saving, procurement, waste-diversion, and water saving
- Leaders in social equity initiatives

Peer and Aspirational Green Labs Programs

International Institute for Sustainable Laboratories (I2SL):

- ➔ Resource for engaging stakeholders in advancing safety + sustainability of laboratories
- ➔ **Labs2Zero Project:** program developed specifically for decarbonizing lab spaces
- ➔ **Smart Labs Toolkit:** free, online resource to assist lab owners and users with implementing own programing to promote sustainability, safety, and efficiency

Recommended Green Lab Initiatives:

1. Energy and Water
2. Waste Reduction
3. Reuse and Recycling
4. Green Chemistry and Safety
5. Procurement and Consumables
6. Equity and Social Justice

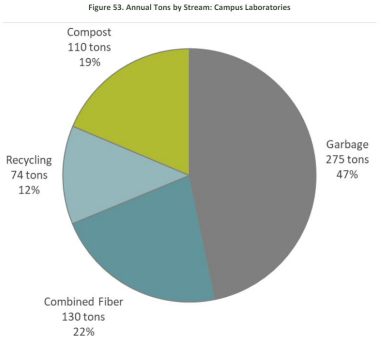
Recommendation 1: Energy and Water

- **Shut the Sash Campaign**
  - 1,700 Fume Hoods at UW
  - Potential to save $2.6 Million Dollars annually
- **International Freezer Challenge**
  - Increases in ULT freezer temperature set points leading to 36% in energy savings
  - Maximize Freezer use and longevity
- **Laboratory Bench Top Timers**
  - Most lab equipment left on 24/7
  - At $30/outlet, can save 13 kWh a year
- **Autoclave Maintenance**
  - Broken solenoid valves can waste over 200,000 gallons of water a month ($46,000/yr)
  - Green Labs staff trained to identify and report common issues and faults

Recommendation 2: Waste Reduction

➔ **Borrowing and Sharing**
- Focus on sharing and borrowing with other labs before purchasing

➔ **Composting**
- $69.50/ton - cheapest option available
- Compostable paper towels at hand washing stations
- Compost bins in all laboratories
- Improved, lab specific signage
  - Over $10,000 in savings



➔ **Sustainable Purchasing and Packaging Reduction**
- Purchase through UW Surplus
- Connect directly with vendors
- Standardization of lab procurement - training, education, and resources

Recommendation 3: Reuse and Recycling

➔ **Reuse**

- UW Surplus for lab equipment
- Reusable options and circular systems from vendors
- Purchasing choices

➔ **Recycling**

- $116.55/ton ($166.55/ton if more than 15% contaminated)
  - 70% cost increase in 2018 due to contamination
- Improved, lab specific signage
- Education on materials taken by UW Recycling
- Vendor services for recyclables not taken by UW Recycling

Recommendation 4: Green Chemistry and Safety

➔ **Green Chemistry is Lab Safety**
- ⅝ safety Incidents at UW were due to hazardous chemical use
- UW Generates 112,000 kg of hazardous waste a year

➔ **Labeling and Tools to promote environmentally friendly choices**
- ACT Labels
- Solvent Selection Tool
  - 95% Reduction in excess ether usage, 50% reduction in chlorinated solvent use

➔ **Integration with existing systems**
- MyChem
- UW Chemical Exchange

Recommendation 5: Procurement and Consumables

➔ **Overall campus lab waste stream: 47% paper & 14% plastics**

➔ **Sourcing reusable materials**

- Disposable paper liners < chemical-resistant trays
- Plastic sample containers < compostable or recyclable counterparts
  - Thermo-Fisher reusable plastic labware

➔ **Pipettes and related materials**

- Stackable racks, bagged pipette tips, and/or borosilicate glass pipettes
  - 10 uL, natural graduated, non-sterile tips (per USA Scientific):
    - bags = $23.45 for 1000 tips
    - racks = $39.50 for 960 tips

Recommendation 5: Procurement and Consumables

- **Recyclable procurement**
  - Kimberly Clark SmartCycle
    - Recycles personal protective equipment, nitrile gloves, safety glasses, masks, and chemical wipes
- **Equipment**
  - Rebates of $600 through Seattle City Light for Stirling ULT freezers
    - Saves up to 5,250 kWh/year/unit, or 65% energy savings
- **Rheaply, Warp-it Reuse Network, or USwap**

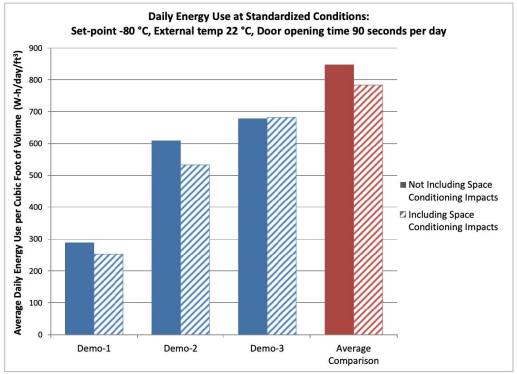


Figure III.1 Adjusted Daily Energy Consumption for Demo and Average Comparison ULTs with and without Space Conditioning Impacts*

➔ Environmentally preferred purchasing (EPP)

- My Green Lab database
- Green Laboratory Products on UW Sustainability website

A74 | Pipet Tips

	A	B	C	D	E
1	Product	Name/Link	Vendor	Sustainable Attributes- Vendor Description	Vendor Product Desription and Performance
73					
74	Pipet Tips	ShaftGard SpaceSaver tips in stacked refills 2-20 µl, 250 µl, and 1000 µl	Rainin	1 SpaceSaver takes the place of 10 conventional tip racks. The Spacesavers uses 85% less plastic packaging.	SpaceSaver refill racks protect tips from exterior contamination. The outer sleeve functions as a dispenser; refilling just takes seconds.
75	Pipet Tips	Green-Pak LTS Tips	Rainin	Ecological. Recyclable PET. 75% less than in conventional packaging.	Ideal refill solution for filter tip users The GreenPak consists of individually packaged and wrapped refill-packs for our LTS Tip Racks. They are especially useful for Filter Tip users, where the popular StableStak is not available. Protected. Each refill is completely sealed. No contamination. Contamination free. Safe protection against contamination. Clean. During loading the hands never touch the tips. Ecological. Recyclable PET. 75% less than in conventional packaging.
76	Pipet Tips	Green-Pak Universal Tips	Rainin	Ecological. Recyclable PET. 75% less than in conventional packaging.	Ideal refill solution for filter tip users The GreenPak consists of individually packaged and wrapped refill-packs for our traditional tip Racks. They are especially useful for Filter Tip users, where the popular StableStak is not available. Protected. Each refill is completely sealed. No contamination. Contamination-free. Safe protection against contamination. Clean. During loading, hands never touch the tips. Ecological.Recyclable PET. 75% less than in conventional packaging
77	Pipet Tip Rack	Rainin TerraRacks	Rainin	Less weight, 50% less plastic, and 100% recyclable.	Sturdy as conventional racks, yet made with less than half the plastic and completely recyclable. In fact, the hinged TerraRack shell is made from PETE, which is easily recycled. TerraRacks with BioClean tips are pre-sterilized, eliminating autoclaving.
	Room Temperature	DNAstable Trial Kit	Sigma-Aldrich	Biomatrica technology, enables safe storage of biological material at	N/A

Recommendation 6: Equity and Social Justice

➔ **No use of sweatshop labor or other unethical labor practices**

- Procurement Office, Green Purchasing program
- Top-down equitable resource allocation

➔ **Space Optimization**

- Equal access to lab spaces + uplifting minority identities in lab settings

➔ **Equitable Research supports UW's commitment to diversity**

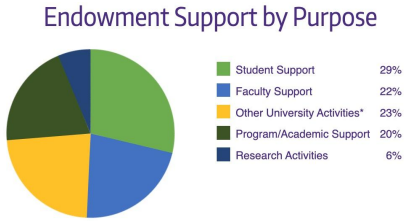
Interim Q&A

Incentives: Potential Funding Sources

- **$1.87 billion in grants and contracts in 2023**
  - BETR grants, initiative by I2SL

- **Supporting research for standardization of metrics**
  - Consolidated Endowment Fund distributed $167 million to campus unit holders in 2023
  - Green Seed Fund = sustainable research grant

- **Direct funding of Green Labs**
  - Rotating funds invested into the program (UVA)
    - Money saved through initiatives
    - Advancement on donor funding; donation option



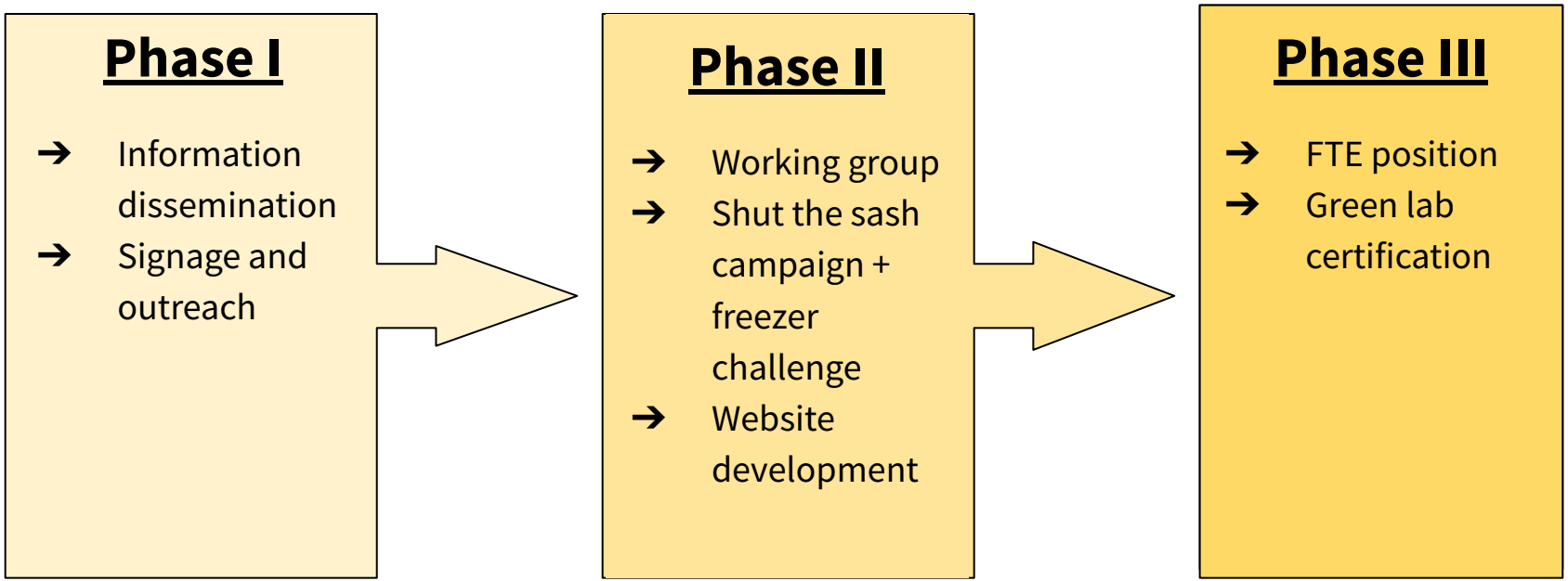
* A portion of the University's operating funds is invested in the CEF. Distributions benefit campus-wide programs.

Incentives: Staffing Recommendations

➔ **UW should hire 1 full-time staff member to oversee and manage the Green Labs program**

- Housed within the UW Sustainability Office, with support from EH&S and Finance and Facilities
  - Safety procedures through the certification process can be enforced through an FTE position
  - Coordination between various stakeholders; incentivize lab participation
    - Unavoidable turnover rate
- Working group-
  - Researchers and Staff, Students, the Waste Management Team, Environmental Health and Safety, and the Procurement Office
  - Campus Sustainability Fund

Implementation Roadmap



Concluding Remarks

Reinstating the UW Green Labs Program provides major opportunities for **cost savings**, alignment with **sustainability commitments**, and making labs a **safer** place for staff, faculty, and students.

This comprehensive program will reestablish the University of Washington as a leader in sustainable labs among top public R1 institutions and support our institutions cutting edge research

Thank You!

A special thanks to Lisa Dulude and Fred Pursell, and our interviewees Doug Gallucci, Phillip Reid, Liz Gignilliat, Alex Hagen, Jean Hushebeck, and Greg Miller, Star Scott, and Fiona Bradford

Q&A

Appendix

Interviews and Informational Sources:

- ➔ Doug Gallucci and Alex Hagen, UW EH&S
- ➔ Philip Reid, UW Vice Provost
- ➔ Liz Gignilliat, UW Recycling
- ➔ Jean Hushebeck and Greg Miller, UW Facilities
- ➔ Star Scott, UGA Green Labs
- ➔ Fiona Bradford, UVA Green Labs

SWOT Analysis – **S**trengths

- ➔ National leader for sustainability performance
- ➔ High-ranking R1 institution
- ➔ Strong support for sustainability across campuses
- ➔ Professional connections with diverse sectors
- ➔ History and experience with Green Labs Program

SWOT Analysis – **W**eaknesses

- ➔ Smaller staff size
- ➔ Quick project turnaround
- ➔ Many previously involved personnel left/retired
- ➔ Lack of engagement with this process across campuses
- ➔ Green Labs system outdated/in need of overhaul

SWOT Analysis – **O**pportunities

- ➔ Ability to align with UW's mission to decarbonize
- ➔ Potential to implement program at UW after proposal
- ➔ Potential to further relationships with other universities/organizations
- ➔ Support to hire FTE to run/implement program
- ➔ Increase in importance/relevance of sustainability principles

SWOT Analysis – **T**hreats

- ➔ Changes in personnel/public sentiment
- ➔ Multiple communication channels
- ➔ Information on resource use difficult to access/calculate
- ➔ Limited by UW budget and outside funding
- ➔ Bureaucratic nature of public university

Appendix

List of Peer Institutions:

- ➔ Clemson University
- ➔ Florida State University
- ➔ Georgia Institute of Tech
- ➔ Ohio State University
- ➔ Purdue University
- ➔ Rutgers University
- ➔ Texas A&M University
- ➔ University of California, Berkeley
- ➔ University of California, Davis
- ➔ University of California, Irvine
- ➔ University of California, Santa Barbara
- ➔ University of California, San Diego
- ➔ University of California, Los Angeles
- ➔ University of Connecticut
- ➔ University of Florida
- ➔ University of Georgia
- ➔ University of Illinois Urbana-Champaign
- ➔ University of Maryland
- ➔ University of Massachusetts-Amherst
- ➔ University of Michigan Ann Arbor
- ➔ University of Minnesota
- ➔ University of North Carolina, Chapel Hill
- ➔ University of Pittsburgh
- ➔ University of Texas, Austin
- ➔ University of Virginia
- ➔ University of Washington
- ➔ University of Wisconsin, Madison
- ➔ Virginia Tech

Appendix

Laboratory Information:

➔ Approximate number of labs across three UW campuses: **775**

- UW Bothell - 25
- UW Tacoma - 20
- UW Seattle Main Campus – 730

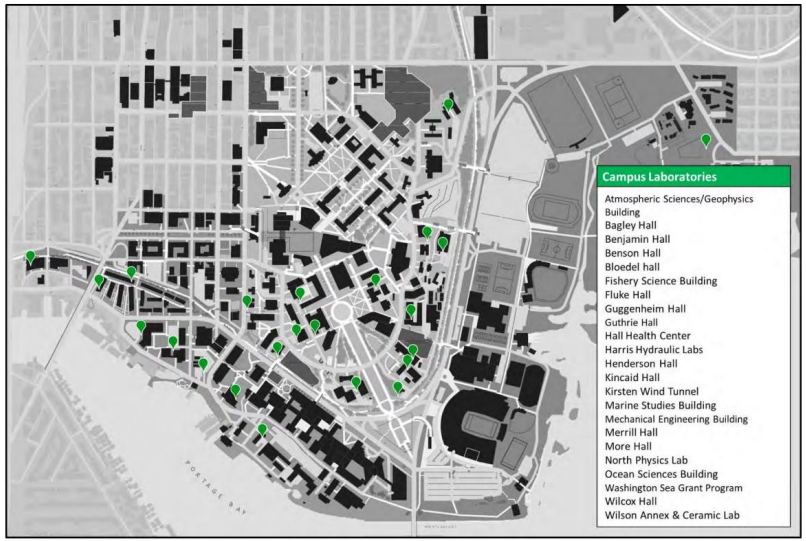
➔ Definitions of a lab:

- A facility where the "laboratory use of hazardous substances" takes place. A workplace where relatively small amounts of hazardous substances are used on a nonproduction basis.
- A group of people under the same supervisor who work in a set of spaces that fit the definition above and are in one specific building.

Appendix

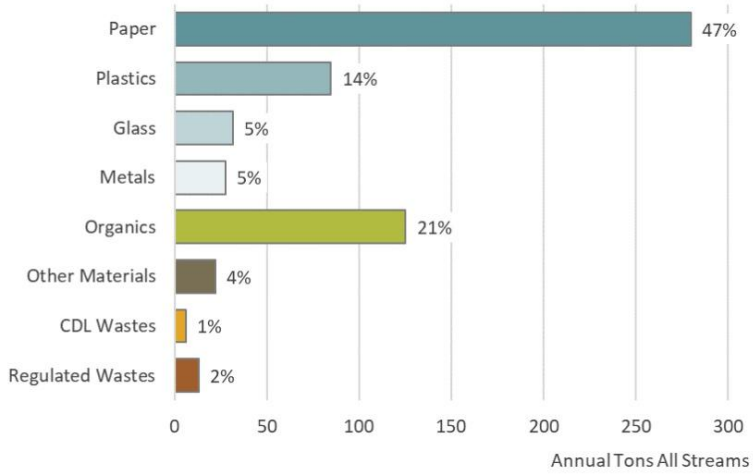
Seattle Campus Labs and Waste Collection Locations

Figure 52. Garbage, Recycling, and Compost Collection Locations: Campus Laboratories



Seattle Campus Labs Waste Stream

Figure 55. Annual Tons by Material Class, All Streams: Campus Laboratories



Appendix

BETR grants

Points to consider:

- **Requests to US Congress and others for funding could be strengthened** by commitments to connect efficiency expectations with research dollars. This would maximize the positive impacts of investments and minimize the environmental footprint of research.
- **Instead of spending start-up dollars to purchase duplicative equipment resources** already present at a research institution, start-up packages could be structured to meet the needs of new faculty by providing funding to use existing shared equipment facilities (cores).
    - Furthermore, avoiding duplicative equipment also reduces the need for expensive laboratory infrastructure and space (i.e.; 1000 sq.ft. of lab space costs approximately US$1 million in new construction at the University of Colorado Boulder).
- **In Facilities and Administrative (F&A) Rate applications, research institutions could voluntarily include efforts for efficiency** (particularly with space use) to demonstrate what they are doing to keep overhead costs down.

Efficiency in the News

United Kingdom Research and Innovation (UKRI) is already taking action to address the need for efficiency and environmental sustainability in the UK granting and investment processes.

"By 2025 we will have embedded environmental sustainability across all our investments by acting on our environmental values and changing **our funding and decision-making** processes and criteria to raise the standard for environmental sustainability across our sector."

-**UKRI,** ***An organization uniting the funding bodies in the UK***

Check out the **UKRI Environmental Sustainability Strategy** released in 2020